

EVAPORATION AND CONDENSATION

Purpose

Students explore how temperature affects the processes of evaporation and condensation. Sometimes the air we breathe may be polluted by the evaporation of hazardous compounds.

Materials

- Vanilla extract in a closed container (so you can't smell it)
- A small, empty container with a waterproof cover or lid (plastic wrap or piece of plastic bag will work)
- A larger container or bowl that the smaller container will fit in
- A teaspoon (plastic spoon is fine)
- Hot water
- Worksheet (included)

What to Do

1. Discuss evaporation and condensation. Evaporation is the change from a liquid to a gas. Condensation is the opposite: the change from gas to liquid. Discuss examples students may have seen: tea kettle boiling, rain puddles drying up, water vapor from our breath condensing on the windows or looking like clouds of smoke when we are outside on a cold day. Discuss how heat or thermal energy is involved in these processes. When you heat a liquid enough, it will change into gas. For example, if you heat water to 100 degrees C., it turns into water vapor. (The added thermal energy causes the water molecules to move faster until they have enough energy to escape the liquid as gas particles. As a gas cools, the molecules slow down until they return to a liquid state.)
2. Divide the class into groups of 2-3 (if larger, each group should choose a recorder to write observations on the worksheet, a technician to handle the materials, and a spokesperson who will report to the class.) Each group should have the materials listed above.
3. Follow the procedure and answer the questions on the worksheet.
4. As a class, discuss the findings of each group. Have the class agree on definitions for evaporation and condensation.

Extension

Compare evaporation and condensation of the vanilla with the change that occurs when a candle burns. One is a physical change: the vanilla extract changes from liquid to vapor in evaporation and from a vapor to a liquid in condensation. The other is a chemical change: the candle burns and the substances making up the candle are changed. New substances such as the black soot are produced. In a physical change, a substance only changes form. In a chemical change, a substance changes both form and composition.

ACTIVITY WORKSHEET – EVAPORATION AND CONDENSATION

1. When the lid to the vanilla container is still on, what do you smell?_____
2. Open the lid of the vanilla container. Pour a teaspoonful of vanilla into the small container. What do you smell?

3. Why couldn't you smell the vanilla before you opened the lid to the vanilla container?

4. Cover the small container with a lid or plastic wrap. Wait 5 minutes. Write a definition for evaporation while you wait. Note any changes inside the container.

Evaporation is _____

Changes in the small container:

5. Pour a small amount of hot water in the larger container—not too much or it will overflow! Place the small container with the teaspoonful of vanilla in the hot water. Wait 5 minutes. Write a definition for condensation.

Condensation is _____

6. Check the small container. What do you see and smell?
